Checklist - Procurement of equipment for treatment of food waste to recover and recycle nutrients

Introduction – purpose and basis of the checklist

This is a recipe and checklist intended for procurement advisors on when and how to procure equipment (industrial composting machines) for composting and treatment of food waste and how to apply criteria and requirements to acquire the most circular solutions for the treatment of the food waste. Industrial composting are compact machines that different industries such as hotels, nursing homes, schools, and catering sector can utilize to decrease the amount of organic waste transported to disposal. Industrial composting enables local use of the compost material, which can be used to produce new food or used as a soil improver in public landscape gardening and local food production.

The content of the checklist is based on interviews conducted by Biogas Oslofjord with suppliers of industrial composting machines as well as case studies from the Norwegian municipalities of Lilleström and Nannestad and a selection of hotels located in central suburban areas. The evaluation of different industrial composting vendors as well as determining the most important factors for the circular use of the final product was done in collaboration with researchers at the Norwegian University of Life Sciences.

Structure of the checklist

The checklist consists of a pre-analysis section and a section with questions for market dialogue and suggested actions based on the market inquiry. *In the pre-analysis section, you consider what kind of needs you want to cover with the procurement and how to determine what are the most circular and desirable options for treating the food waste.* At this stage you should also make considerations on how you want to dispose of and utilize the end product from the machine. Here you have three methods, from basic, intermediary and advanced.

In the next sections you are shown tables with relevant questions for market inquiries you can do with suppliers prior to making the procurement as a way of assessing market readiness for circular solutions. The market dialogue questions are related to both functional requirements of the equipment and circular/green procurement criteria for choosing the best model and vendor. The questions are listed in the left column and recommended follow-up actions and choices between using minimum requirements and award criteria are listed in the right-hand column of the tables.

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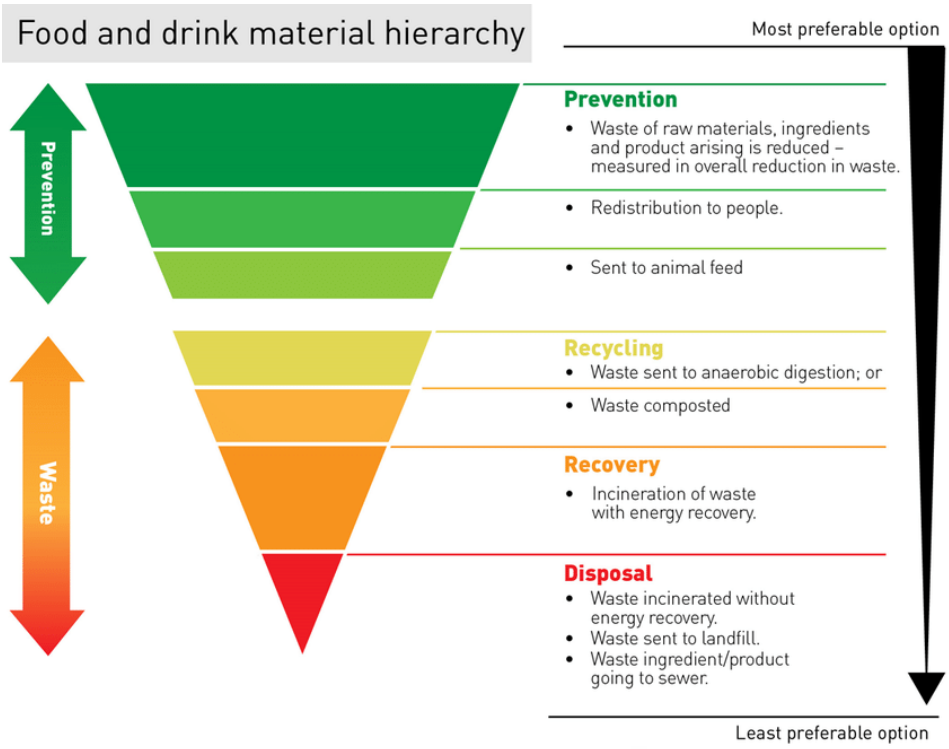
Market inquiry/dialogue

Procurers should always conduct market inquiries before you submit the tender to determine market readiness for the environmental qualities you are addressing. This can be done either with digital or real-life supplier conferences or directly (for instance via e-mails) with relevant suppliers/vendors of the equipment.
If you receive at least three responses of yes to the relevant question, you can use a minimum requirement. If you receive less than three responses of yes or the answers are inconclusive, you can consider making this aspect a part of an environmental/circular award criterion.

1. Pre-analysis

What is the most circular and desirable option for treating the food waste?

First you must consider if composting is the best and most circular option for treating food waste in your area. Using food waste to produce biogas is higher in the circular hierarchy of food and drink materials than composting, see illustration below. Careful considerations should be done to estimate whether the distance between the facility producing the food waste and the nearest biogas plant is big enough to make compost the most favourable option. Consider also all other higher circular value options that could be possible, like measures to reduce overall waste produced. See the figure below for which options are higher and lower in the food and drink material hierarchy.



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2. Considerations on planning for the use of the final product

Planning for how you will use the final product can have a significant impact on the circularity of the procurement. Do you plan to treat and sell products from the end waste material yourself, or do you plan to dispatch the product to a facility that can make further use of it, or do you plan for it to be collected by the ordinary waste management company? There are three main options for the product from industrial composting machines, the highest and most advanced level coming first. After you have considered this, go to section 3.

Advanced level:

On site-use of the end waste to become an approved on-site fertilizer producer.
This requires a process with the National Authority for food safety, where you will need approved lab tests on hygenization for the produced materials to be allowed to sell them to make sure they follow limits in fertilizer regulation. This kind of certification enables production of soil amendments and the possibility to use the final product for your own organization's services and functions or generate income by selling the soil amendment. City farmers and greenhouses are potential customers for the soil amendments.

Intermediate level

Dispatching the final product from the composting to a facility which can perform the stabilization and sanitation necessary to use it as a soil improvement or fertilizer. This ensures that the final product and its nutrients can be retained and utilized effectively to replace fossil-based soil amendments or peat. Whether suppliers of the equipment/machinery offer this kind of service should be investigated as part of the market inquiries.

Basic level

Regular handling of the final product: Here the waste management authority collects the final product. This reduces the waste with 70-90% and reduces the cost of waste handling, but you cannot control what happens to the final product or how it is utilized.

Notes on use of different fractions from the treatment of the food waste:
The grease fraction can be sent to biogas production nearby, if such a plant or facility exists in your area. Usually delivering of waste to a biogas plant includes a gate-fee (the fee you need to pay to have your waste handled), but if there is an energy rich substrate, the plant may pay to get access to the energy rich substrate.

Liquid fraction: Machines that separate, and "exhaust" the liquid fraction, will not have a liquid fraction. However, there are machines that separate the liquid into a separate container. This is a very good plant fertilizer when mixed with water. Hence, planning for utilization of this concentrate could mean a source of income, if sold or reduced cost related to purchase of fertilizer form own production if relevant. Farmer, city farmers, green houses are relevant customers.

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3.Questions for market dialogue and suggested actions – capacity and functionality

Perform market inquiries, make minimum requirements and award criteria based on the responses received. In the table below procurers will find a series of suggested market inquiry questions and suggestions and guidance for follow-up actions based on the responses given in the market inquiry.

Question	Suggested follow-up action, comments
Capacity: How much food waste can the machine handle per day/week?	Choose the machine size that matches the needed capacity for handling food waste.
Spatial requirements and handling of equipment: How much space do I need? What kind of electricity and water supply is needed? How many persons are needed to operate the machine?	Obtaining a technical examination from different suppliers is necessary to see if they fulfil your requirements. As a part of market dialogue machine vendors can perform on-site inspections providing information about needed electric effect, water supply, space and exhaust possibilities.
Do the machines offered include a dumb-bell lifter and automatic discharge?	This will simplify operating the machine. Consider making it a part of technical award criteria
Technical functions: Does operating the machine require a drain or a liquid fraction?	
Does the machine offer solutions for separating the liquid waste fraction in a separate container?	This is relevant to whether you will have an option for a nutrient-rich plant fertilizer concentrate that can be mixed with water
Temperatures and emissions to air	**Suggested actions**
Can the supplier offer a guarantee on the temperature for the composting unit process of >70 degrees Celsius?	If three or more bidders respond yes, consider making it a minimum requirement. If responses are inconclusive or less than 3 yes, consider making a technical performance award criterion where guarantee on the temperature for the composting unit process makes up a part of the criterion.

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Emission data: Can the supplier offer data on the emissions to air of climate gases Co2e, methane (CH4), and nutrient gases NO2e?	If 3 or more than 3 bidders respond yes, make it a minimum requirement that they can offer this kind of data. Consider also making it a part of award criteria that the bidder submitting the machine with the lowest amount of climate gas emissions to air (co2-e) will be awarded

4.Questions for market dialogue – circular and environmental aspects

Perform market inquiries and make minimum requirements or award criteria for green and circular performance of the solutions offered by the bidders. Suggested actions based on the responses in the market inquiry are shown in the right-hand column.

Question	Suggested follow-up action
Utilization of final product: Can you offer options for utilization of the final product and hygienization of the final product from the machine? If yes, describe briefly what kind of options you can use and which methods and certificates you have for hygienization.	If more than 3 responses of yes, make it a minimum requirement. If no supplier or fewer than three suppliers say yes, consider making it part of award criteria that suppliers can offer options for utilization of the final product
Second-hand alternatives Can you offer second-hand versions of the machine?	If at least three suppliers answer yes, consider making the submission of a second-hand machine a minimum requirement in the tender If fewer than three suppliers respond yes, consider making it part of an award criterion that suppliers can offer a second-hand version of the machine
Climate footprint data Can you offer data on the climate footprint of the production of the machine?	If several bidders respond yes, consider making the ability to offer data on the climate footprint of

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	the production of the machine part of an environmental award criterion.
Loss of nutrients Can you offer data on loss of nutrients, Phosphorus and Nitrogen, from the industrial composting unit?	Consider making it a part of award criterion on environmental quality for the bidder providing the machine with the lowest loss of nutrients, like phosphorus and nitrogen.

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